Environmental Protection Agency

Test Cell 3 Tracer Gas Injection Procedure

This procedure is written for the Environmental Protection Agency, National Vehicle and Fuel Emissions Laboratory (NVFEL) internal use. The use of specific brand names by NVFEL in this procedure are for reference only and are not an endorsement of those products. This document may be used for guidance by other laboratories.

NVFEL Reference Number

016A

Implementation Approval

Original Procedure Authorized by EPCN #271 on 2-5-2001

Revision Description

(1) 09-18-2001 The purpose of this change is to update the Group Responsible name per EPCN #316

Table of Contents

Figures

Figures Continued

1. Purpose

The purpose of this working procedure is to describe the equipment and steps required to perform a Tracer Gas (propane) Injection Procedure

2. Test Procedure

101 Turn on the test site air handling system and wait a minimum of 15 minutes for the site temperature to stabilize.

102 Place a propane kit with a valid calibration sticker in the test cell and allow the kit temperature to stabilize for a minimum of 15 minutes.

103 In the control room, on the computer desktop, double-click on "Adapt32" icon. See Figure 1.

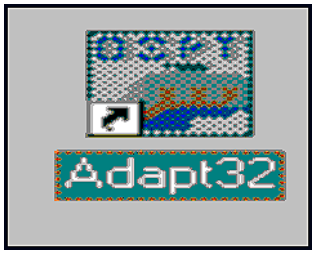

Figure 1
Adapt Icon

104 When the “ADAPT” dialog appears, click on the "Cancel" button. See the arrow in Figure 2.

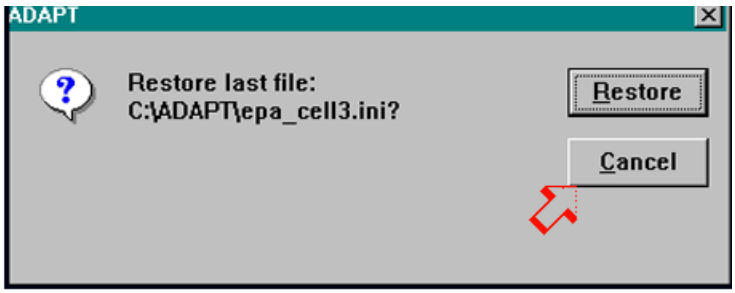

Figure 2
Restore Last File

105 Select "EPA_Cell3ini" from the "File to open" dialog box. See the circle in Figure 3. Click on the "Open" button. See the arrow in Figure 3.

The "ADAPT c:\adapt\epa_cell3ini" screen will appear.

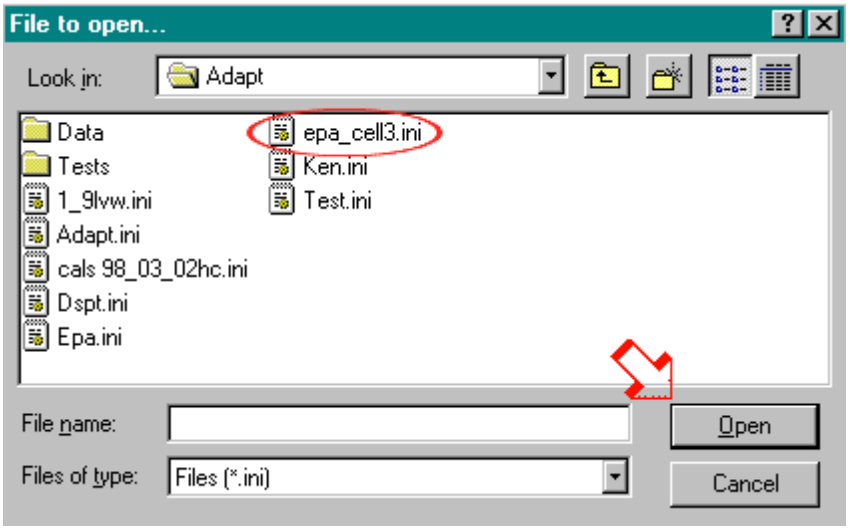

Figure 3
File to open

106 Click on "Schedule" at the top of the screen. See the arrow in Figure 4. Choose "Select Test" from the menu. The "Test Select" box will appear.

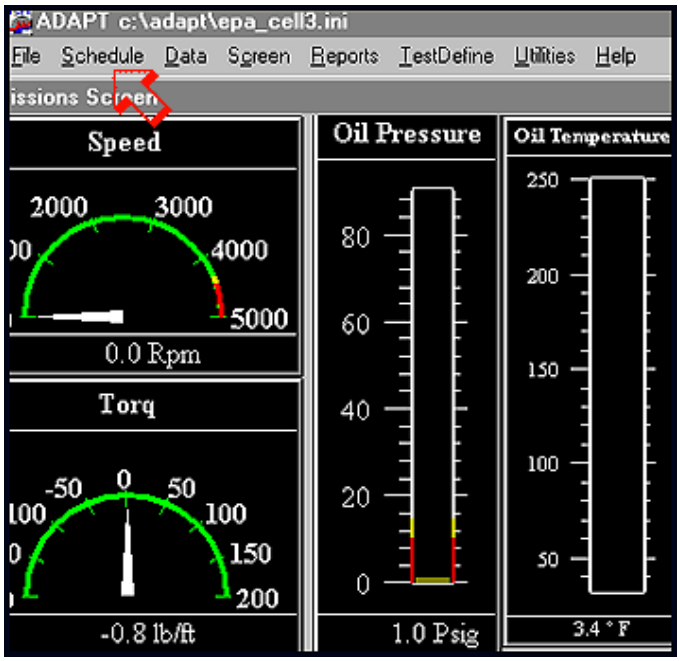

Figure 4
Select “Schedule” then “Select Test” from Menu

107 On the “Select Test” dialog box, under "Select a test," choose the appropriate test: "CELL#_E.TST" or "CELL#_W.TST". See the circle in Figure 5.

Click on the "Select" button. See the arrow in Figure 5. The "ADAPT c:\adapt\epa_cell3ini" screen will return.

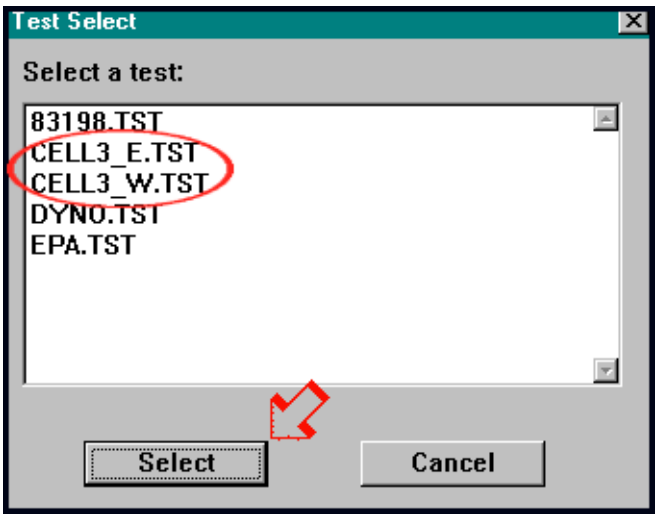

Figure 5
Test Select Screen

108 At top of the "ADAPT c:\adapt\epa_cell3ini" screen, click on "Schedule.” See the arrow in Figure 6. Select "Start Test" from the menu. The "Enter Header Data" box will appear.

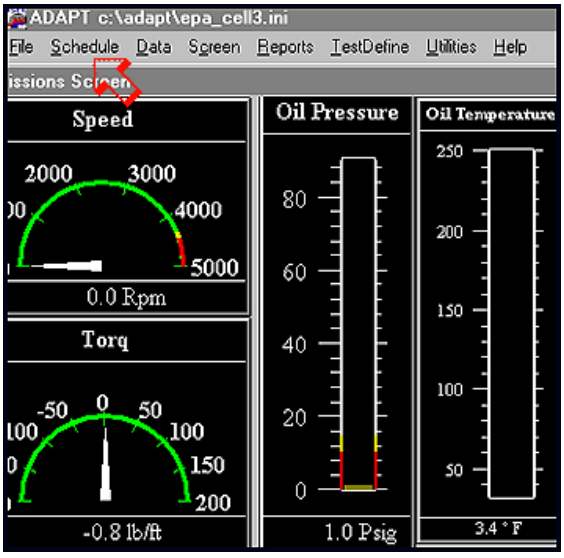

Figure 6
Select “Schedule” then “Test Select” from Menu

109 Enter the following in the "Enter Header Data" dialog box:

"Test Number:" Today's Date in yy/mm/dd format.
See arrow number 1 in Figure 7.

"Project: "tgi1" See arrow number 2 in Figure 7.

"Dyno Rotation:" "0" for East Engine, "1" for West Engine.
See arrow number 3 in Figure 7.

"Fuel Type:" Check the list next to the data entry field and enter the number corresponding to the appropriate fuel type.

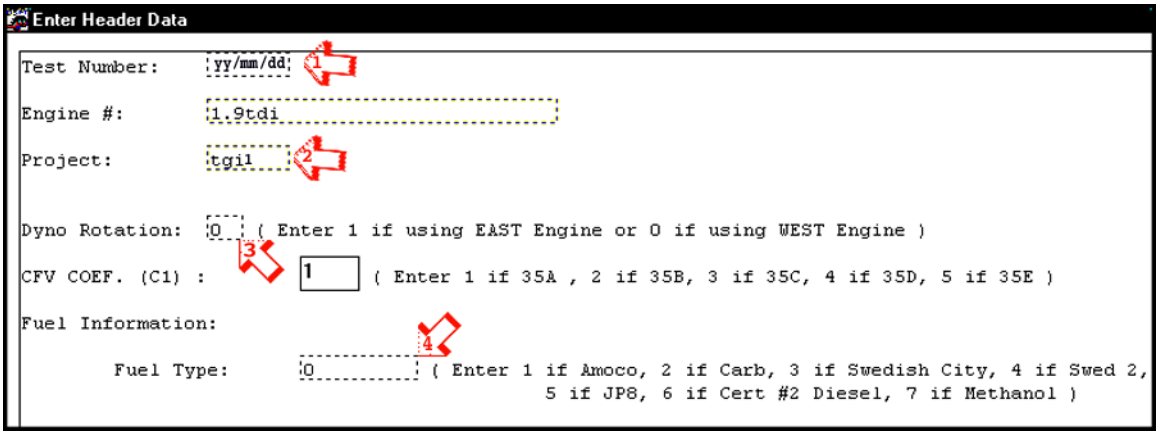

Figure 7
Enter Header Data

110 On the "Enter Header Data" screen, under "Database Options," click on the "OK" button. See the arrow in Figure 8. The "ADAPT c:\adapt\epa_cell3ini" screen will appear.

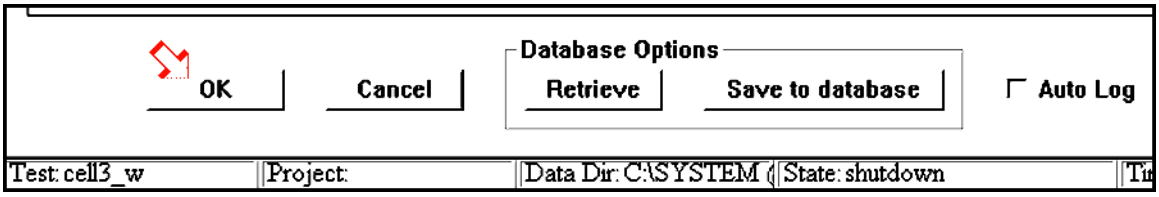

Figure 8
Database Options

111 Click on "Screen" from the menu bar. See the arrow in Figure 9. Select "Emissions screen" from the menu options. If "Emissions screen" is not an available choice, select "More Screens" from the menu and choose "Emissions screen" from the next menu.

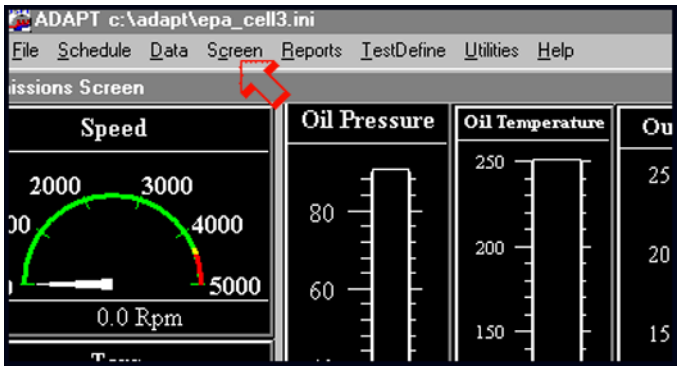

Figure 9
Select “Screen” from Menu

112 Click on the "HC Range" button, see the arrow in Figure 10, until "16" appears under "Range". See the circle in Figure 9.

Figure 10
Select HC Range

113 Click on "Screen" from the menu bar. See the arrow in Figure 11.

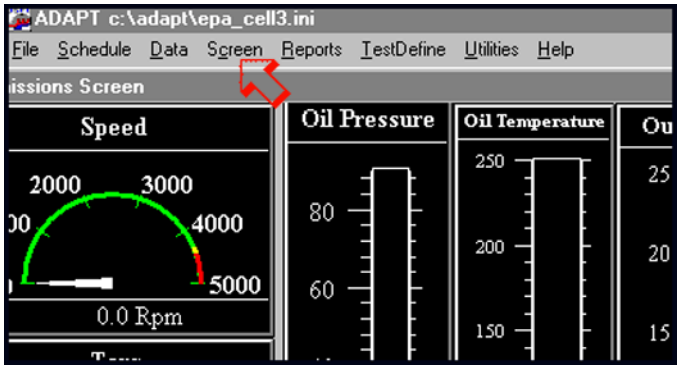

Figure 11
Select “Screen” from Menu

114 Select "AVL415" from the menu options. If "AVL415" is not an available choice, select "More Screens" from the menu and choose "AVL415" from the next menu the "AVL415" screen will appear.

115 On the "AVL 415" screen, use the keyboard and enter the following in the field below each header:

"3.000000" for "Number of Smoke Meas" label. See arrow 1 in Figure 12.

"1096.000000" for "Volume of Measure" label. See arrow 2 in Figure 12.

"6.600000" for "Time of Measure" label. See arrow 3 in Figure 12.

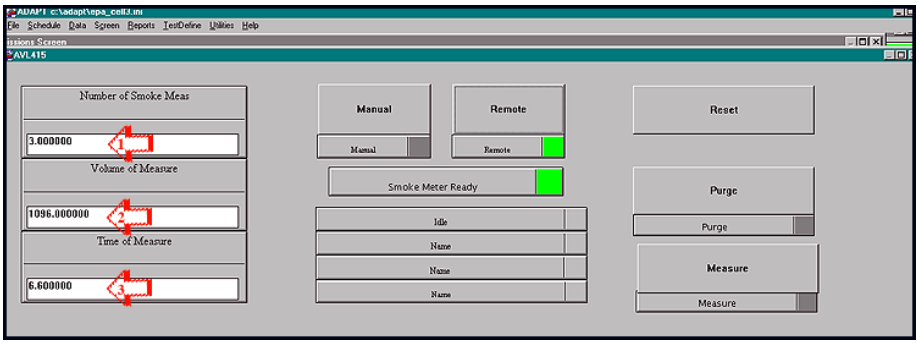

Figure 12
AVL Screen

116 On the "AVL 415" screen, select the "Remote" button. See the arrow in Figure 13.

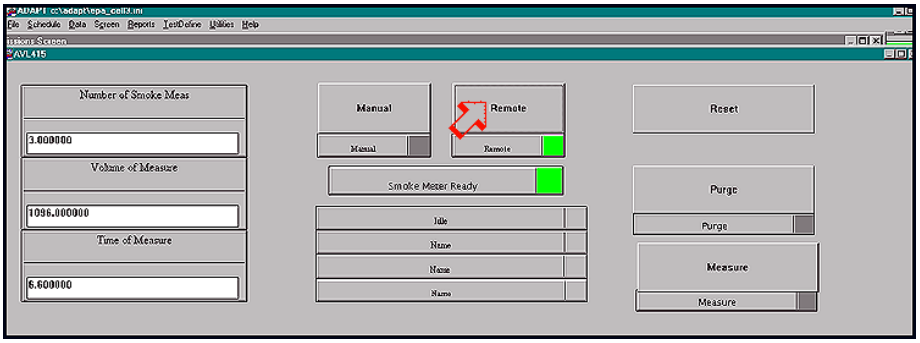

Figure 13
Select Remote

117 Click on "Screen" from the menu bar. See the arrow in Figure 14.

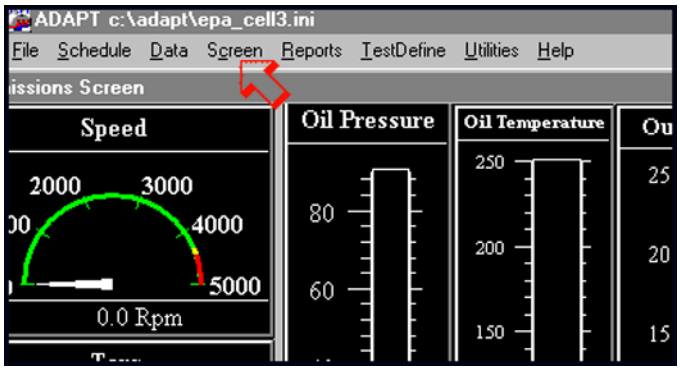

Figure 14
Select “Screen” from Menu

118 Select "Counter Timer" from the menu options. If "Counter Timer" is not an available choice, select "More Screens" from the menu and choose "Counter Timer" from the next menu. The "Master Counter Timer" screen will appear.

119 On the "Master Counter Timer" screen, select the following 4 buttons under the "Master" button to set to the green condition:

"CVS Vmix"	See arrow 1 in Figure 15.
Secondary Dilution Flow	See arrow 2 in Figure 15.
Total Dilution Flow	See arrow 3 in Figure 15.
Total Fuel Flow	See arrow 4 in Figure 15.

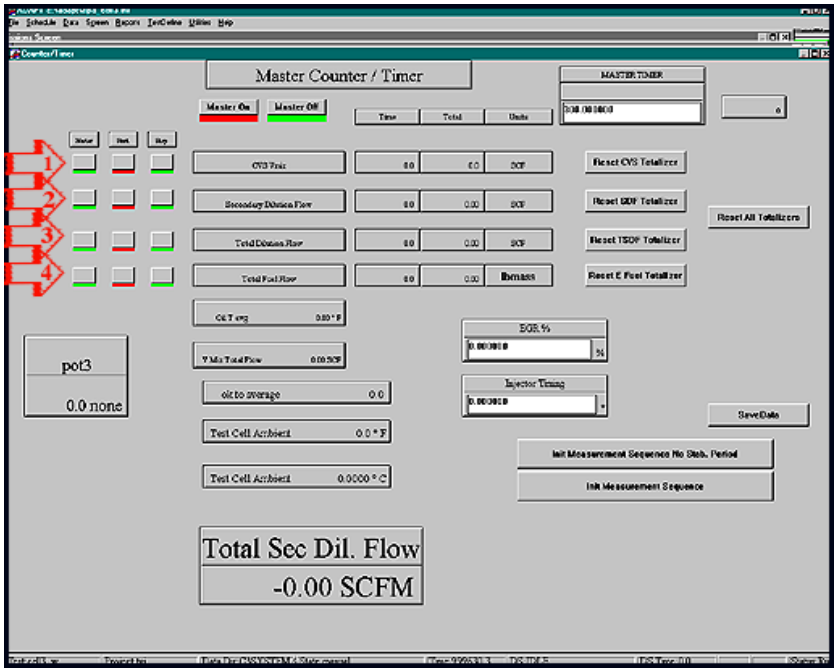

Figure 15
Master Counter Timer

120 Click on "Screen" from the menu bar. See the arrow in Figure 16.

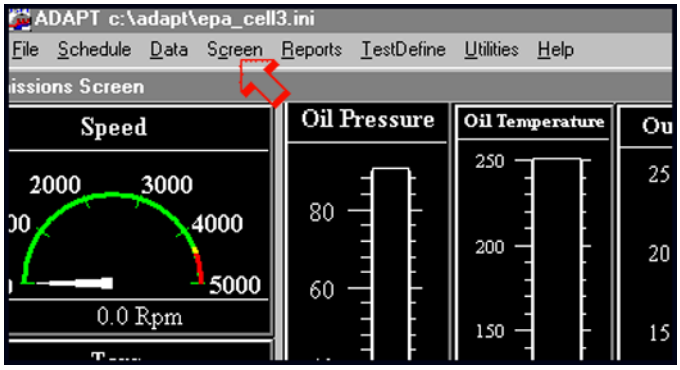

Figure 16
Select “Screen” from Menu

121 Select "PNGV Run Screen" from the menu options. If "PNGV Run Screen" is not an available choice, select "More Screens" from the menu and choose "PNGV Run Screen" from the next menu. The "PNGV Run Screen" will appear.

122 Go into the cell and set up the analyzer according to WP 006, PNGV Horiba Emission Analysis System Start-up / Shut Down. Ensure that the analyzer is in the sample model

123 Ensure that the blower is turned on. If not turn it on by pushing the “Blower On” button on “PNGV Run Screen.”

124 In the control room, select the "Update Emissions Background" button on the "PNGV Run Screen.” See the arrow in Figure 17. The "Background Sample Timer" will automatically start and run for 5 minutes. When the sample time returns to zero, the background level will appear in the "HC Bkgd" field. See the circle in Figure 17.

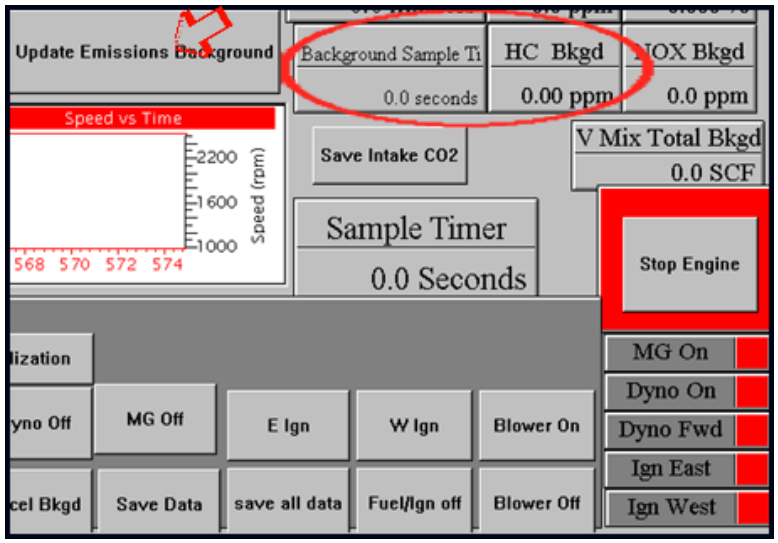

Figure 17
Update Emissions Background

125 Return to the test cell and insert the propane kit rosette in the dilution tunnel. See Figure 18. Set the propane kit pressure to 85 psi.

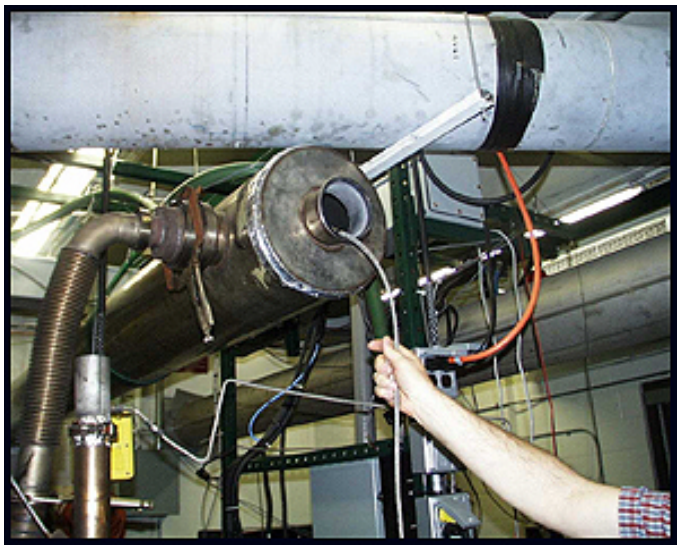

Figure 18
Insert Rosette in CVS

126 In the control room, select the "Initialize Measurement Sequence" from the "PNGV Run Screen" display. See the arrow in Figure 19.

The system will automatically collect the sample.

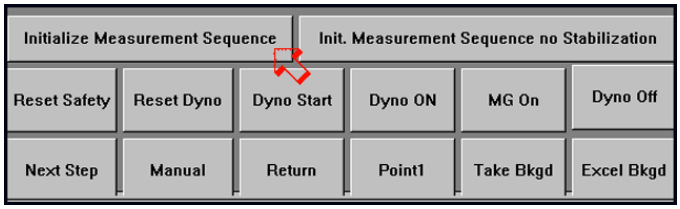

Figure 19
Initialize Measurement Sequence

127 When the sample collection is finished, go into the test cell and read the temperature and pressure from the propane kit. See Figure 20.

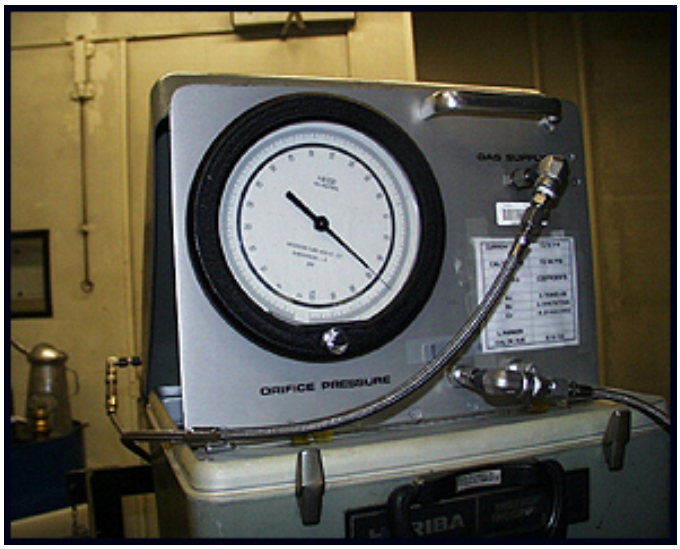

Figure 20
Propane Kit

128 Click on "Reports" from the menu bar. See the arrow in Figure 21. Select "Log Data Report" from the menu options. The "Data Report Setup" window will appear.

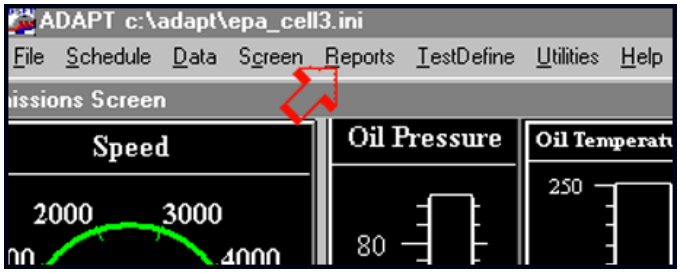

Figure 21
Select “Reports” from Menu

129 Under "Project" in the "Data Report Setup" window, select "TGI." See the circle in Figure 22. Select the "Save" Button. See the arrow in Figure 22.

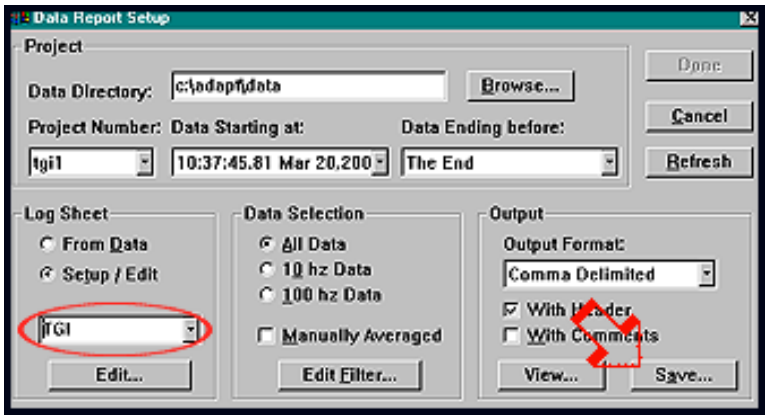

Figure 22
Data Report Setup

130 When the "Date" box appears, use the keyboard to enter the date followed by "TGI" in the "yy_mm_ddTGI" format. Click on the "OK" button.

131 Select the "Start" button at the bottom of the display. From the menu that appears, select "Program." From the next menu, select "Excel."

132 After the Excel program has loaded, select "File" from the top menu. Select "Open" from the menu that appears.

133 Select the file with the path, "C:/adapt/data/TGI1."

134 In the "TGI1" folder, select "TGICALC_OFFICIAL.xls."

135 On the "TGICALC_OFFICIAL.xls." screen, enter the data from the test.xls screen (the Excel spreadsheet data file). When all data has been entered the recovery error will be automatically calculated and shown next to the "Recovery Error" cell.

136 If the percent of error displayed next to the "Recovery Error" cell. is equal to or less than ±2.0%, the injection procedure passes. See Figure 23.

If the percent of error displayed exceeds ±2.0%, follow this procedure and run the test a second time.

If, after the second attempt, the percent of error displayed exceeds ±2.0%, notify a senior technician.

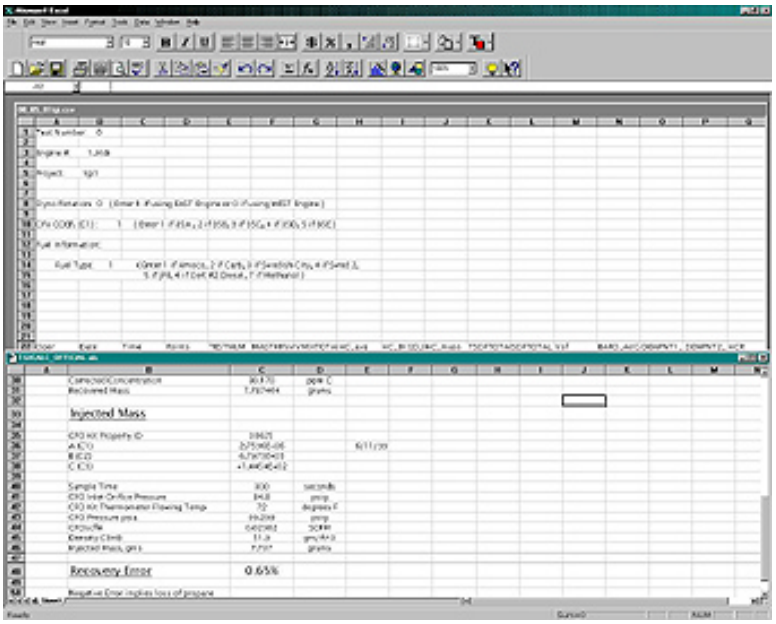

Figure 23
Excel Spreadsheet for % Error

137 Print the "TGICALC_OFFICIAL.xls." screen and file the report in the "TGI" file.

3. Acceptance Criteria

3.1 The test site temperature must stabilize for a minimum of 15 minutes before starting the procedure.

3.2 The propane kit used must have a valid calibration sticker.

3.3 The propane kit temperature must stabilize for a minimum of 15 minutes after it has been moved into the test site.

3.4 After opening the shut-off valve and adjusting the pressure to 90 ±5 PSIA the propane tank must stabilize for a minimum of 10 minutes.

3.5 The percent of error displayed under "Recovery Error" on the "Propane Processor" data screen must be within ±2.0%.